

## CLAIMS

What is claimed is:

- 1           1.     An extended wear chain comprising:  
2           a chain component; and  
3           a coating on said component including one or more of zirconium,  
4           titanium, a zirconium compound, and a titanium compound.
- 1           2.     The extended wear chain of claim 1, wherein said coating forms  
2     a metallurgical bond with said component.
- 1           3.     The extended wear chain of claim 2, wherein said metallurgical  
2     bond is formed by said coating being at least slightly implanted into a surface  
3     of said component.
- 1           4.     The extended wear chain of claim 1, wherein said chain is  
2     adapted for cutting a substance.
- 1           5.     The extended wear chain of claim 1, wherein said coating  
2     includes zirconium nitride.
- 1           6.     The extended wear chain of claim 1, wherein said coating  
2     includes titanium nitride.
- 1           7.     The extended wear chain of claim 1, wherein said coating forms  
2     a layer on said component less than or equal to 12 microns thick.
- 1           8.     The extended wear chain of claim 1, wherein said chain  
2     component is a cutter.
- 1           9.     An extended wear chain comprising:

2 a chain component; and  
3 a coating on said component including one of zirconium nitride and  
4 titanium nitride.

1 10. The extended wear chain of claim 1, wherein said coating forms  
2 a metallurgical bond with said component.

1 11. The extended wear chain of claim 10, wherein said metallurgical  
2 bond is formed by said coating being at least slightly implanted into a surface  
3 of said component.

1 12. The extended wear chain of claim 1, wherein said chain is  
2 adapted for cutting a substance.

1 13. The extended wear chain of claim 1, wherein said chain  
2 component is a cutter.

1 14. A chainsaw chain comprising:  
2 a plurality of cutters;  
3 means for connecting said plurality of cutters; and  
4 a coating on each of said plurality of cutters including one or more of  
5 zirconium, titanium, a zirconium compound, and a titanium  
6 compound.

1 15. The chain of claim 14, wherein said coating forms a  
2 metallurgical bond with said cutter.

1 16. The chain of claim 15, wherein said metallurgical bond is formed  
2 by said coating being at least slightly implanted into a surface of said cutter.

3 17. The chain of claim 14, wherein said means for connecting said  
4 plurality of cutters is coated with one or more of zirconium, titanium, a  
5 zirconium compound, and a titanium compound.

6           18.    The chain of claim 17, wherein said means for connecting said  
7 plurality of cutters is one or more of a tie strap, a pre-set tie strap, a drive link,  
8 and a depth gage.

1           19.    A chainsaw comprising:  
2 an extended wear chain including:  
3 a chain component; and  
4 a coating on said component having one or more of zirconium,  
5 titanium, a zirconium compound, and a titanium  
6 compound.

1           20.    The chainsaw of claim 19, wherein said coating forms a  
2 metallurgical bond with said component.

1           21.    The chainsaw of claim 20, wherein said metallurgical bond is  
2 formed by said coating being at least slightly implanted into a surface of said  
3 component.

1           22.    The chainsaw of claim 19, wherein said component is a cutter,  
2 and further wherein a plurality of cutters are combined with a plurality of  
3 means for connecting said plurality of cutters to form said chain.

1           23.    The chainsaw of claim 19, wherein said coating includes  
2 zirconium nitride.

1           24.    The coated chain of claim 19, wherein said coating includes  
2 titanium nitride.

1           25.    A method for making an extended wear chain comprising the  
2 steps of:  
3 producing a chain or a chain component; and  
4 coating said chain or chain component with one or more of zirconium,  
5 titanium, a zirconium compound, and a titanium compound.

1           26.    The method of claim 25, wherein said coating is accomplished  
2    using a vacuum deposition process.

1           27.    The method of claim 26, wherein said vacuum deposition  
2    process is a physical vapor deposition process.

1           28.    The method of claim 27, wherein said physical vapor deposition  
2    process is one of an ion plating, an electron beam gun, a thermal evaporation,  
3    a sputtering, a laser ablation, and a cathodic arc process.

1           29.    The method of claim 27, wherein said physical vapor deposition  
2    process is an ion plating process.

1           30.    A method for making an extended wear chain comprising the  
2    steps of:  
3           placing a chain or a chain component into a vacuum chamber; and  
4           coating said chain or chain component with a wear-extending  
5           substance by using a vacuum deposition process.

1           31.    The method of claim 30, wherein said vacuum deposition  
2    process is a physical vapor deposition process.

3           32.    The method of claim 31, wherein said physical vapor deposition  
4    process is one of an ion plating, an electron beam gun, a thermal evaporation,  
5    a sputtering, a laser ablation, and a cathodic arc process.

1           33.    The method of claim 31, wherein said physical vapor deposition  
2    process is an ion plating process.

3           34.    The method of claim 30, wherein said wear-extending substance  
4    is one of zirconium, titanium, a zirconium compound, and a titanium  
5    compound.

1           35.    The method of claim 30, wherein said wear-extending substance  
2 is one or both of zirconium nitride and titanium nitride.

1           36.    A method for making an extended wear chainsaw chain  
2 comprising the steps of:  
3           placing a chain cutter into a vacuum chamber; and  
4           depositing a layer of one or both of titanium nitride and zirconium  
5           nitride on a surface of said cutter by using a physical vapor  
6           deposition process, wherein a metallurgical bond is formed  
7           between said surface of said cutter and said one or both of  
8           titanium nitride and zirconium nitride.

1           37.    The method of claim 36, wherein said metallurgical bond is  
2 formed by said coating being at least slightly implanted into said surface of  
3 said component by said physical vapor deposition process.

1           38.    The method of claim 36, wherein said physical vapor deposition  
2 process is an ion plating process.

1           39.    A method for making an extended wear chainsaw chain  
2 comprising the steps of:  
3           stamping a plurality of chain components from a raw material;  
4           placing some portion of said plurality of chain components into a  
5           vacuum chamber; and  
6           depositing a layer of one of titanium nitride and zirconium nitride onto  
7           surfaces of said some portion of said plurality of chain  
8           components by using a physical vapor deposition process,  
9           wherein a metallurgical bond is formed between said surfaces  
10          and said one of titanium nitride and zirconium nitride.

1           40.    The method of claim 39, wherein said metallurgical bond is  
2 formed by said coating being at least slightly implanted into said surfaces by

3    said physical vapor deposition process.

1            41.    The method of claim 39, wherein said physical vapor deposition  
2    process is an ion plating process.

1            42.    The method of claim 39, wherein at least one of said some  
2    portion of said plurality of chain components undergoing said depositing step  
3    is a cutter.

1            43    The method of claim 39, further comprising the step of  
2    assembling said plurality of chain components into a closed-loop chain for use  
3    in a chainsaw.